

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

Irrigation Pit or Regulating Reservoir

(No.)

Code 552B

Regulating Reservoir

Definition

A small storage reservoir constructed to regulate or store a supply of water for irrigation.

Scope

This standard applies to reservoirs created by impounding structures and pits excavated below the ground surface for the short-period storage of either diverted surface water, water pumped from flowing wells, or water from an irrigation delivery system.

Regulating reservoirs created by earth embankments shall be within the scope of the standard for ponds (378).

This standard also applies to concrete and steel regulating reservoirs used to collect water from two or more small irrigation wells for application with a sprinkler or drip irrigation system.

This standard establishes the minimum acceptable quality level for the planning and functional design of irrigation regulating reservoirs. It does not include detailed design criteria or construction specifications for individual reservoirs or components of the regulating facility.

Purpose

To collect and store water until it can be used beneficially to satisfy crop irrigation requirements.

Conditions where practice applies

To store water for relatively short periods to:

1. Provide for regulating fluctuating flows in streams or canals,
2. Provide suitable (usually larger) irrigation streams,

3. Provide for improved management of irrigation water,
4. Permit more efficient use of available labor,
5. Avoid nighttime operation, and
6. Provide storage for reuse irrigation systems.

Conditions where practice applies

This practice applies only to sites meeting all the following criteria and conditions:

1. The existing available irrigation stream is of such size that regulation is necessary to accomplish the intended purposes. For small irrigation wells, collection facilities are needed for efficient operation of the pumping plants.
2. Water must be stored to be used between times of rotation deliveries.
3. An adequate and dependable volume of good-quality water is or can be made available.
4. Topographic, geologic, and soils conditions are suitable for the practical construction of a regulating reservoir having an adequate storage capacity. Pervious soils in the reservoir area can be sealed so that seepage losses are not excessive.
5. If surface runoff enters the reservoir, the contributing drainage area is or can be protected against erosion so that normal sedimentation does not materially shorten the planned life of the reservoir.

Design criteria

Capacity. Irrigation regulating reservoirs shall have a usable capacity sufficient to permit the existing irrigation stream to be regulated so that irrigation water can be applied with reasonably high efficiency. In computing capacity requirements, due consideration shall be given, where applicable, to diverted inflow,

surface runoff, precipitation, evaporation, and seepage. Excessive seepage losses shall be prevented by the use of an adapted method of sealing or lining. Additional capacity shall be provided as necessary for sediment storage.

Capacity requirements for regulating reservoirs used as part of a system for collecting water from two or more small wells shall be based on the discharge capacities of the contributing wells and on the operation frequency of the sprinkler.

Reservoir design. Irrigation regulating reservoirs created by earthen dams, enclosed embankments, excavated pits, and the related appurtenant structures shall be designed according to the standard for ponds (378).

Concrete and steel regulating reservoirs shall be designed according to the standard for troughs or tanks (614).

Inlet protection. If the inflow enters the reservoir, the side slope of the reservoir shall be protected against erosion by the use of a pipe inlet or some other suitable structure. The capacity of the inlet structure shall be no less than that required to accommodate the maximum anticipated rate of inflow.

Overflow protection. An overflow protection structure having a capacity equal to or greater than the inlet stream shall be provided for an enclosed embankment. This structure may be designed and installed in combination with the outlet works.

Outlet works. Outlet works shall be provided for the controlled release of irrigation water. The outlet works may consist of a gated conduit through or over the embankment for gravity flow to the irrigated area or to a pumping plant. They may also consist of a pumping plant designed to lift water directly from the reservoir basin.

The capacity of the outlet works shall be no less than that required to provide the outflow rate needed to meet peak period irrigation system demands.

Plans and specifications

Plans and specifications for irrigation regulating reservoirs shall be in keeping with

this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.

Regulating Reservoir Specifications

Earthen irrigation regulating reservoirs shall be constructed according to the construction and materials specifications for ponds (378).

Concrete and steel regulating reservoirs shall be constructed according to approved standard drawings and the associated construction and material specifications established for troughs or tanks (614).

Planning considerations for water quantity and quality

Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
2. Effects on downstream flows or aquifers that would affect other water uses or users.
3. Potential for irrigation water management.

Quality

1. Effects on erosion and the movement of sediment, pathogens, and the soluble and sediment-attached substances carried by runoff.
2. Effects on the movement of dissolved substances to ground water.
3. Short-term and construction-related effects on the quality of downstream water courses.
4. Potential of uncovering or redistributing toxic material.
5. Effects on wetlands or water-related wildlife habitats.
6. Effects on the visual quality of water resources.

NOTEKEEPING

Design Survey

Frequently, all a farmer needs to make a decision is a rough estimate of the reservoir

size and yardage. A few soil borings and a centerline profile will usually enable the technician to produce the information needed.

The use of approved charts and tables permits the design survey and construction layout on many reservoirs to be carried on as one operation – a desirable procedure.

A soils investigation shall be made on all reservoirs (embankment type and dugouts) and the findings recorded on EWP-39F or LA-315. If there is a water table, the depth at which it exists will be recorded.

In those cases where the landowner decides not to construct the reservoir, the data shall be retained in the field office files for a reasonable period of time in the event the farm changes ownership, or the landowner later decides to proceed with construction.

Provide special construction specifications where unusual foundation conditions or fill materials require special care in construction; or where specific types of construction machinery are required.

Construction Layout

Profile and cross-section the proposed reservoir location as needed to set cut, fill and slope stakes.

Planned yardage may be determined by using yardage tables, or by working through applicable columns on Form LA-ENG-34 or LA-ENG-14. Where the base is irregular on an embankment type reservoir the end areas shall be plotted and measured, and the yardage obtained by working through applicable columns on the form.

Construction Check

Profile the centerline of the embankment, taking readings every 100 feet and measuring the top width. Take at least one representative cross-section. Record profile and cross-section data, dimensions and elevations of pipes and conduits, kind of pipe used, and other data on Form LA-ENG-34.

Chain the embankment, either during design survey, or the construction layout, or the construction check.

In the case of an excavated pond, take at least one longitudinal and one lateral cross-section. Prepare sketch of reservoir on Form LA-315, and show dimensions.

Due to the inaccuracies of the earth-moving equipment commonly used on earthen embankments where yardage is relatively small, it is often impractical to obtain the exact embankment as planned.

Embankments will be acceptable under the following conditions:

1. The steepest sections of the upstream and downstream slopes do not exceed those planned by more than $\frac{1}{2}$ horizontal to 1 vertical.
2. Occasional lows on the centerline profile of the completed embankment of no more than 0.2 foot below the design height including shrinkage allowance.
3. The plotted cross-section of the completed embankment verifies that the minimum (a) top and base widths and (b) cross-sectional area below the planned top elevation of the embankment, with allowance for shrinkage, have been met.

Due to the inaccuracies of earthmoving equipment commonly used, excavated reservoirs will be acceptable when the steepest sections of the side slopes of the completed dugout are slightly steeper than the minimum, provided the required yardage has been removed, the required depth has been obtained and the bottom and top dimensions have been equaled or exceeded.

Recording Data

Field notes will be recorded on Form EWP-39F for embankment type reservoirs and on Form LA-315 for excavated reservoirs. Check the notes carefully to determine that all specifications have been met. Date and sign statement, "This practice meets specifications." Note any exceptions.

Recording Completed Practice

Show completed reservoir in red on field office copy of the conservation plan map, or, if not available, on aerial photograph or overlay.

Filing Notes and Records

See National Handbook for Resource Conservation Planning, Louisiana Supplement.

side slopes of the completed pit are slightly steeper than the minimum, provided the required yardage has been removed, the required depth has been obtained and the bottom and top dimensions have been equaled or exceeded.

Recording Data

Field notes will be recorded on Form LA-ENG-14.

Check the notes carefully to determine that all specifications have been met. Date and sign statement, "This practice meets specifications." Note any exceptions.

Recording Completed Practice

Show completed pits in red on field office copy of the conservation plan map, or, if not available, on aerial photograph or overlay.

Filing Notes and Records

See National Handbook for Resource Conservation Planning, Louisiana Supplement.